Practitioner Perspectives on Hypothesis Testing Strategies in the Context of Functional Behavior Assessment

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Abstract

When results of descriptive functional behavior assessments (FBAs) are inconclusive, experimental analysis methods can be used to directly test hypotheses about when or why a student engages in challenging behavior. Despite growing research on practical variations of hypothesis testing in schools, these methods are rarely incorporated in FBAs in practice. To inform practitioner perspectives on hypothesis testing as a component of FBAs, we surveyed a statewide sample of school practitioners who participate in the FBA process (n = 253). The survey addressed their views on three hypothesis testing strategies (i.e., functional analysis, antecedent analysis, concurrent operant analysis) across several dimensions. On 5-point Likert type scales, participants rated acceptability of procedures, feasibility of implementation, utility of results, conditions in which they would likely use or recommend the strategy, and perceived barriers. We used descriptive and nonparametric statistical analyses to compare ratings among the three hypothesis testing strategies. The majority of participants rated all three strategies favorably with respect to utility. However, ratings on acceptability, feasibility, and barriers were differentiated and favored the concurrent operant analysis over the functional and antecedent analyses. We discuss implications for practice and future research on incorporating hypothesis testing in FBAs for students with persistent challenging behavior.

Keywords: *functional behavior assessment, hypothesis testing, functional analysis, antecedent analysis, concurrent operant analysis*

Practitioner Perspectives on Hypothesis Testing Strategies in the Context of Functional Behavior Assessment

The functional behavior assessment (FBA) process has become an established approach for developing effective individualized behavior support plans in schools (Goh & Bambara, 2012). While legal mandates identify the minimum set of conditions that warrant an FBA for students with disabilities (IDEA, 2004), contemporary models of schoolwide behavior support (e.g., Positive Behavior Interventions and Supports [PBIS]) take a more proactive approach. These multi-tiered systems incorporate FBA in a continuum of behavior support based on student responsiveness. Regardless of disability status, any student whose challenging behavior persists following the delivery of (a) preventative behavior support strategies at Tier 1 and (b) targeted interventions at Tier 2 is identified as needing intensive behavioral intervention at Tier 3—a level of support at which FBA is a critical component (Crone, Hawken, & Horner, 2015).

To inform behavior support plans, FBAs require (a) operationally defining the behavior(s) of concern, (b) identifying the relevant routines and antecedent events (i.e., establishing operations) that evoke these behaviors, and (c) identifying consequences that reinforce these behaviors. Some combination of indirect assessments (e.g., interviews, questionnaires) and direct observations are often necessary to define behaviors of concern and identify relevant contexts in which they typically occur. However, with respect to isolating the antecedents that evoke problem behavior and the consequences that reinforce them, indirect and descriptive assessments can fall short. When used to generate hypotheses about behavior function, indirect assessments are subject to bias and inconsistency across raters and time (Dufrene, Kazmerski, & Labrot, 2017). Data from direct observations are more objective, but their descriptive nature makes it difficult to distinguish events that merely co-occur with

challenging behavior from those that contribute to their occurrence (Hanley, 2012; Pence, Roscoe, Bourret, & Ahearn, 2009). Additionally, extended observation is sometimes needed to capture multiple instances of problem behavior, with no clear guidelines for how much data are sufficient to warrant interpretation (Lloyd & Wehby, 2018).

In contrast, experimental analysis involves directly testing one or more hypothesis about the variables contributing to challenging behavior (Crone et al., 2015; O'Neill, Albin, Storey, Horner, & Sprague, 2015a). Relative to indirect and descriptive assessments, experimental or "hypothesis testing" approaches are more rigorous, but also require more planning, resources, and expertise. The model of hypothesis testing with the most empirical support is known as a functional analysis (see Beavers, Iwata, & Lerman, 2013 for review). Building from early conceptual work on potential motivations of challenging behavior (e.g., Carr, 1977), Iwata and colleagues (1994) developed an assessment technology to systematically test a series of hypothesized functions of challenging behavior. This analysis involves conducting multiple test conditions and a control condition in which specific antecedents and consequences of problem behavior are carefully programmed, and it remains the most commonly used model for functional analysis in research on severe problem behavior (Beavers et al., 2013).

Research on FBA practices in schools suggests practitioners commonly rely on indirect assessments and direct observations. Surveys of school personnel (i.e., special educators, school psychologists, district-level administrators) indicate interviews and informal observations are the most frequently used components of FBA whereas functional analysis is the least frequently used component (Katsiyannis, Conroy, & Zhang, 2008; O'Neill, Bundock, Kladis, & Hawken, 2015b). Recent surveys also suggest that a majority of practicing behavior analysts (30%–47% of whom worked in public schools) commonly rely on indirect and descriptive assessment data to

design behavior support plans (Oliver, Pratt, & Normand, 2015; Roscoe, Phillips, Kelly, Farber, & Dube, 2015). Specifically, a national survey by Oliver et al. (2015) found 75% and 94% of practicing behavior analysts indicated they "always" or "almost always" conduct indirect and descriptive assessments, respectively, whereas only 36% reported the same for functional analysis. In another statewide survey, Roscoe et al. (2015) found 84.4% of behavior analysts reported using descriptive assessments most frequently, whereas only 10.2% identified using functional analysis most frequently.

The question of whether, and under what conditions, functional analysis should be a component of FBA has long been debated in the field (e.g., Gresham et al., 2004; Hanley, 2012; Sasso, Conroy, Stichter, & Fox, 2001). In recent years, researchers have called for a continuum of function-based support, and proposed a "basic" model of FBA for students who begin to show mild-to-moderate (i.e., non-dangerous) challenging behavior in only one or two specific contexts at school (Loman & Horner, 2014). This model focuses on training typical school personnel to conduct staff interviews and direct observations to inform behavior support plans. Results of several training studies have supported the technical adequacy of this approach when applied to students with emerging mild-to-moderate challenging behavior (Loman & Horner, 2014; Strickland-Cohen & Horner, 2015). However, to provide a true continuum of function-based support, models are also needed to meet the needs of students with severe and persistent challenging behavior. For these students, empirical comparisons between indirect or descriptive assessment outcomes and outcomes from experimental analyses have shown partial correspondence at best (e.g., Alter, Conroy, Mancil, & Haydon, 2008; Lewis, Mitchell, Harvey, Green, & McKenzie, 2015), with other studies documenting discrepant outcomes (e.g., Cunningham & O'Neill, 2000; Pence et al., 2009; St. Peter et al., 2005; Thompson & Iwata,

2007). Moreover, results of a recent meta-analysis on function-based interventions suggested FBAs that included a functional analysis led to more effective interventions than those relying on indirect and/or descriptive assessments only (Gage, Lewis, & Stichter, 2015). Taken together, the literature seems to suggest that—at least for some students with persistent challenging behavior—hypothesis testing is necessary to ensure the FBA leads to an effective, function-based intervention. Particularly when results of descriptive FBAs are inconclusive, or when an intervention based on a descriptive FBA is not effective, hypothesis testing may be warranted (Lloyd, Weaver, & Staubitz, 2017; O'Neill et al., 2015a).

For hypothesis testing to be incorporated into a continuum of function-based support in schools, practical variations of the standard functional analysis are needed. Results of recent literature reviews on school-based experimental analysis have shown that several adaptations and alternatives to the standard functional analysis have been evaluated by research teams in public school settings (Anderson, Rodriguez, & Campbell, 2015; Lloyd, Weaver, & Staubitz, 2016). Three approaches in particular seem promising for school settings and have been shown to lead to effective interventions. The first is a functional analysis consisting of a single test-control comparison. Antecedents and consequences of problem behavior are programmed to test hypotheses of when and why a student engages in challenging behavior. However, rather than testing multiple hypotheses in the same assessment, a single hypothesis is tested (Iwata & Dozier, 2008; Hanley, 2012; e.g., Payne, Scott, & Conroy, 2007; Santiago, Hanley, Moore, & Jin, 2016). This limits the total number of assessment conditions from four or five in the standard model (Iwata et al., 1994) to two: one test condition and one control condition. In the test condition, the hypothesized establishing operation (e.g., diverted attention, task demand) is present, and the associated reinforcer (e.g., teacher attention, a break from work) is delivered

contingent on problem behavior. In the control condition, the hypothesized establishing operation is absent and the student has free access to reinforcement regardless of their behavior. Increased levels of challenging behavior in the test condition relative to the control condition are interpreted to confirm the hypothesized reinforcer.

A second approach is known as the structural or antecedent analysis. Antecedent analyses have been applied extensively in classroom settings to evaluate the effects of various instructional and social variables on student challenging behavior and to inform preventative interventions (e.g., Lewis et al., 2015; Stichter, Sasso, & Jolivette, 2004). This approach focuses on systematically manipulating antecedent events (with consequences held constant) to test hypotheses about what conditions trigger or evoke challenging behavior. For example, to test a hypothesis that difficult task demands evoke challenging behavior, levels of challenging behavior would be compared between a test condition, in which a teacher assigns a difficult task demand, and a control condition, in which the teacher assigns an easy or preferred task demand. Higher levels of challenging behavior in the test condition relative to the control condition are interpreted to confirm the hypothesized establishing operation.

Whether conducting a functional or antecedent analysis, at least one condition is designed to evoke challenging behavior. A third hypothesis testing strategy that does not require evoking problem behavior is a concurrent operant analysis. In a concurrent operant analysis, students are presented with a series of choices between two or more options that are simultaneously available (Harding et al., 1999). Measures of choice allocation, rather than problem behavior, are used to interpret results. While this strategy does not directly test the function of challenging behavior or conditions that evoke it, concurrent operant analyses can be used to identify conditions likely to reinforce appropriate behavior. This approach is uniquely suited for cases in which evoking

challenging behavior as part of the assessment process is not a viable option. For example, concurrent operant analyses have been used for individuals who engage in passive or covert forms of problem behavior (e.g., Grace, Thompson, & Fisher, 1996; Quigley et al., 2013), problem behaviors that present a safety risk (e.g., elopement; Piazza et al., 1997), and those likely to produce false negative functional analysis outcomes due to low base rates (Finkel, Derby, Weber, & McLaughlin, 2003). Importantly, results of concurrent operant analyses have been used to design effective reinforcement-based interventions (Harding et al., 1999; Harding, Wacker, Berg, Barretto, & Rankin, 2002; Lloyd, Randall, Weaver, Staubitz, & Parikh, 2019; Quigley et al., 2013).

Rather than identifying one ideal assessment approach, school personnel need options to allow them to consider several important factors (e.g., time, available resources, severity of challenging behavior) to decide which approach will best serve a student. While empirical demonstrations of hypothesis testing models are important, school practitioner views on these assessment strategies also must be considered if the ultimate goal is to impact practice (Fixsen, Naoom, Blase, Freidman, & Wallace, 2005; Greenwood & Abbott, 2001). The personnel responsible for completing FBAs vary by school and district, and often include special educators and specialists in itinerant positions (e.g., behavior specialists, school psychologists; Conroy, Katsiyannis, Clark, Gable, & Fox, 2002; Crone et al., 2015; Scott, Liaupsin, Nelson, & McIntyre, 2005; Strickland-Cohen & Horner, 2015). The views of this diverse group of school personnel (i.e., practitioners who actively participate in the FBA process) have not been explored with respect to the social validity of hypothesis testing strategies as a component of FBA. While several survey studies related to FBA have been conducted, previous surveys of school stakeholders have focused primarily on general knowledge of FBA and common FBA practices

(Katsiyannis et al., 2008; Nelson, Roberts, Rutherford, Mathur, & Aaroe, 1999; O'Neill et al., 2015b; Villalba, Latus, Hamilton, & Kendrick, 2005). Only one of these surveys evaluated acceptability of FBA procedures, including the functional analysis (O'Neill et al., 2015b); none have focused on specific hypothesis testing strategies representing practical alternatives to the standard functional analysis.

The purpose of the current study was to evaluate practitioner views on three approaches to hypothesis testing that represent practical adaptations or alternatives to the standard functional analysis. Rather than identify a single hypothesis testing strategy likely to meet all student and practitioner needs, we wanted to evaluate and compare views among the three approaches across several dimensions relevant to practice. We developed a survey to address the following research questions:

1. To what extent do FBA practitioners consider functional analysis, antecedent analysis, and concurrent operant analysis procedures to be *acceptable* for students with challenging behavior referred for FBA? Do perceptions of acceptability differ among the three hypothesis testing strategies?

2. To what extent do FBA practitioners consider the functional analysis, antecedent analysis, and concurrent operant analysis *feasible* to complete in the schools they serve? Do perceptions of feasibility differ among the three hypothesis testing strategies?

3. To what extent do FBA practitioners consider results of functional analysis, antecedent analysis, and concurrent operant analysis *useful* to inform behavior support plans? Do perceptions of utility differ among the three hypothesis testing strategies?

4. Do FBA practitioner views on using each hypothesis testing strategy differ depending on student or setting factors (i.e., grade level, disability type, setting type, behavior severity)?

5. What barriers to using each hypothesis testing strategy in school do FBA practitioners identify? Do views on barriers differ among the three strategies?

Method

Participants

To participate in the survey study, school practitioners were asked to confirm that they (a) had at least 2 years of experience supporting students with challenging behavior in public school settings and (b) had participated in the FBA process in a public school setting within the past 2 years. Participants included 253 practitioners representing 68 school districts in [state masked]. Demographic information is displayed in Table 1. The majority of respondents included special educators (68.4%) and behavior specialists (16.2%). Almost all participants (90.5%) reported having teaching certification; 43 participants (17.0%) were board certified behavior analysts (BCBAs). More than half (61.7%) of respondents reported working in schools with multi-tiered systems of behavior support such as PBIS. Nearly all participants reported serving multiple student populations (94.9%) and almost half (44.3%) reported serving multiple grade spans.

Procedures

After obtaining study approval from [university masked] Institutional Review Board, we used multiple recruitment strategies to obtain a representative sample of school practitioners involved in the FBA process in [state masked]. First, we generated a comprehensive list of public schools in the state using a [state masked] Department of Education public school database. We separated schools into three lists by grade level (i.e., elementary, middle, and high) and used a random numbers generator to assign each school a number. We sorted each list of schools in ascending order based on randomly-assigned numbers. Starting at the top of each list, we collected email addresses from school websites for practitioners with job titles that indicated special education services, behavior support services, or other services related to supporting students with challenging behavior (e.g., school psychologist, school counselor). We collected contact information from approximately 120 schools from each list. To expedite data collection,

we omitted schools from districts that required applications to conduct research (14 districts) with the exception of a large urban district near the university for which research approval was already obtained. Using the mail merge feature in Microsoft Office, we sent individual survey invitations to staff via email. To recruit specialists who provide behavior support services in multiple schools within a district, we emailed survey invitations to leaders of district-level behavior support teams and asked them to send the invitation to their team members. In addition, we sent survey invitations to members of the [state masked] Association for Behavior Analysis and board certified behavior analysts (BCBAs) in the state of [state masked] via listserv and email distribution service (Behavior Analysis Certification Board), respectively.

Data collection began in February of 2017 and lasted 4 months. Survey invitation emails included a brief description of the project, a statement that participation was voluntary and responses would be anonymous, and an electronic survey link directing participants to the survey, which was housed on a secure online database (Research Electronic Data Capture [REDCap]; Harris et al., 2009). To encourage participation, the invitation indicated that each person who completed the survey could enter their name in a drawing in which one of every 10 participants was randomly selected to receive a $50 gift card to a store of their choice. (Participant names were entered through a separate and secure link so that survey responses remained anonymous.) Two reminder emails were sent following the initial invitation at 2-week intervals. We calculated response rates from the individual survey invitations sent from randomly-selected schools. From a total of 1,120 email invitations, 284 (25.4%) completed the initial survey questions indicating whether both inclusion criteria were met; 231 (20.6%) reported meeting both inclusion criteria and proceeded to complete the survey. We were not able to calculate separate response rates from the other recruitment strategies because we could not

confirm the total number of survey invitations sent and received.

Instrument

The first author developed the survey to address each research question. The survey had five sections (see Appendix A for a copy of the online survey). The first section focused on the aforementioned inclusion criteria (if not met, survey ended), participant demographics (i.e., gender, race/ethnicity, highest level of education, certification status, school district), work experience (current position, grade levels and populations served, classroom type), and FBA components completed within the last three years. Response options for FBA components (listed in Table 2) were informed by content from published practitioner manuals (e.g., Crone et al., 2015; O'Neill et al., 2015a) and recent literature reviews summarizing FBA practices (e.g., Anderson et al., 2015). The second section included a 2-min video presenting an overview of FBAs. The video was a narrated Keynote presentation and focused on the purpose of FBAs, types of data typically collected for FBAs (indirect assessments and direct observations), and how patterns in these data are used to generate a hypothesis that will guide development of a behavior support plan. The purpose of this video was to clarify the difference between a descriptive FBA and each of the hypothesis testing strategies presented in subsequent sections.

The remaining three survey sections focused on each of three hypothesis testing strategies: functional analysis, antecedent analysis, and concurrent operant analysis (referred to as "choice analysis" in the survey). In each section, participants watched a 2-min video (i.e., narrated Keynote presentation) providing an overview of the strategy. Each video began by identifying the type of question or hypothesis each assessment is designed to address, then presented a brief case scenario to illustrate an example hypothesis, how the strategy would be used to test the hypothesis, and how data would be collected, graphed, and interpreted. A

summary of content presented in each video—as well as links to view each video—are provided in Table 3.

After viewing each video, participants were asked whether they had any previous experience completing that type of assessment. Then, they were asked to rate the extent to which they agreed that each hypothesis testing strategy: (a) is acceptable (i.e., socially and ethically appropriate) for the students with challenging behavior they typically support, (b) would be feasible to implement in the schools they serve, and (c) would produce useful information for designing behavior support plans. All ratings were on a 5-point Likert scale (i.e., 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*). If participants provided ratings of 1 (*Strongly Disagree*) or 2 (*Disagree*) for any question, they were prompted to briefly indicate why they did not agree with the statement. Then, participants were asked to rate the extent to which they would use or recommend each analysis for students of different (a) grade levels (elementary, middle, high school); (b) disability status (intellectual/developmental disability [IDD], emotional/behavioral disorder [EBD], no disability); (c) behavior risk status (high-risk challenging behavior, defined as physical aggression toward others, self, or property and low-risk challenging behavior, defined as calling out, leaving seat without permission, and noncompliance); and (d) in different settings (general education classroom, special education classroom, empty classroom or clinic room). Finally, they were asked to rate the extent to which they agreed that potential barriers (see Table 4) applied to each strategy. Response options for barriers were informed in part by previous FBA survey studies (e.g., Oliver et al., 2015; Roscoe et al., 2015).

As we developed the survey, we solicited feedback from two full professors with expertise in behavioral supports and active research agenda in schools; three practicing behavior

analysts who consulted in public schools; and nine graduate students in special education. We asked for feedback on (a) the extent to which each video overview accurately represented each hypothesis testing strategy, (b) whether response options for previous experience (FBA components) and potential barriers to using each strategy were comprehensive (and if not what items were missing); and (c) clarity and consistency of content and language throughout the survey. Feedback was provided via email, phone, and in-person meetings.

To account for potential sequence effects, we prepared three survey versions that had identical content but differed by presenting Sections 3, 4, and 5 in the following sequences: Version A: functional analysis, antecedent analysis, concurrent operant analysis; Version B: antecedent analysis, concurrent operant analysis, functional analysis; Version C: concurrent operant analysis, functional analysis, antecedent analysis. The sequence of the last three survey sections was determined pseudo-randomly via a Survey Queue feature in REDCap (i.e., use of a dummy survey that captured each participant's record ID and used it to select one of the three survey versions). Survey Version A was completed by 82 participants (32.4%); Version B was completed by 74 participants (29.2%); and Version C was completed by 97 participants (38.3%).

Data Analysis

All participants who completed the initial survey sections on demographics and experience and all questions for at least two of the three hypothesis testing strategies were included in the following analyses (n = 253; 8 surveys were missing responses for one of three hypothesis testing strategies). To address the research questions, we calculated descriptive statistics and used nonparametric statistical procedures to account for the ordinal nature of the Likert-scale data. First, we calculated percentages of participants who provided each rating by survey item and analysis type. We conducted Friedman tests (i.e., the nonparametric equivalent

to a repeated measures analysis of variance [ANOVA]) to evaluate whether mean rankings of practitioner ratings differed among the three hypothesis testing strategies. When statistically significant differences were identified, we conducted Wilcoxon Signed Rank tests (i.e., the nonparametric equivalent to a dependent samples *t* test) to identify which strategies differed. We adjusted criterion alpha levels (i.e., Bonferroni correction) for tests involving multiple sets of comparisons or contrasts. When differences reached thresholds of significance, we calculated effect sizes by dividing the absolute value of the *z* score by the square root of *n* (Corder & Foreman, 2014).

Results

Prior FBA Experience

A summary of participants' reported experience with different components of FBA is presented in Table 2. The vast majority of participants (>90%) reported having experience completing nine of the 12 listed FBA components for at least one student in the past 3 years. A majority (72.7%) reported having experience supervising other school personnel in the completion of an FBA; more than half (60.9%) reported having experience completing an experimental analysis. Only 38.7% reported experience training other school staff on how to complete an FBA. After watching each overview video, roughly half of the participants reported having any previous experience with the functional analysis (58.1%), antecedent analysis (54.2%), and choice analysis (49.4%).

Acceptability

The majority of participants (72.8%–77.3%) agreed or strongly agreed procedures for each hypothesis testing strategy were acceptable (see Figure 1). However, mean rankings of acceptability ratings differed among the three strategies ($F_{r(2)} = 10.8$, $p = .005$; $n = 243$).

Contrasts showed ratings of acceptability were significantly higher for the concurrent operant analysis than for the functional analysis (z = -3.22, p < .017 [adjusted alpha], ES = 0.20 [n = 248]). Ratings of acceptability did not differ significantly between the antecedent analysis and either the functional or concurrent operant analysis.

Feasibility

Relative to acceptability, fewer participants agreed or strongly agreed each hypothesis testing strategy would be feasible to complete at their school (see Figure 1). Fewer than half (42.0%) of participants agreed or strongly agreed the functional analysis would be feasible; more than half (55.0%, 63.3%) agreed or strongly agreed the antecedent analysis and concurrent operant analysis would be feasible, respectively. Mean rankings of feasibility ratings also differed among the three hypothesis testing strategies ($F_{r(2)}$ = 44.14, p < .001; n = 244). Contrasts revealed ratings of feasibility were significantly higher for the concurrent operant analysis than for the functional analysis (z = -6.48, p < .017 [adjusted alpha], ES = 0.41 [n = 248]) and the antecedent analysis (z = -3.73, p < .017 [adjusted alpha], ES = 0.24 [n = 247]). Feasibility ratings were also significantly higher for the antecedent analysis relative to the functional analysis (z = -4.30, p < .017 [adjusted alpha], ES = 0.27 [n = 246]).

Utility

The majority of participants (75.1–76.6%) agreed or strongly agreed each strategy would be useful to inform behavior support plans (see Figure 1). Mean rankings of utility did not differ significantly among the three strategies.

Exploratory Comparisons based on Reported Experience with Each Strategy

Based on unexpectedly high percentages of participants reporting prior experience with each hypothesis testing strategy, we explored whether percentages of participants who agreed or

strongly agreed that each strategy was acceptable, feasible, and useful differed based on reported experience. The question motivating this exploratory comparison was whether the relatively high ratings were driven, at least in part, by respondents who had no previous experience with each strategy. As shown in Figure 2, we found the opposite pattern across hypothesis testing strategies and rated dimensions. Higher percentages of participants who reported previous experience with each strategy agreed or strongly agreed that it was acceptable, feasible, and useful relative to those who reported no previous experience.

Student and Setting Factors

Table 5 presents percentages of participants who agreed or strongly agreed they would use or recommend each hypothesis testing strategy given specific student or setting factors. While more than half of all participants agreed or strongly agreed they would use or recommend each strategy across conditions, ratings varied by factor and hypothesis testing strategy.

Grade level. Higher percentages of participants reported they would use or recommend each strategy for elementary and middle school students relative to high school students. Comparisons of mean rankings of ratings by grade level showed statistically significant differences for all three hypothesis testing strategies ($F_{r(2)} = 41.70$, $p < .001$; $n = 242$ [functional analysis]; $F_{r(2)} = 35.40$, $p < .001$; $n = 244$ [antecedent analysis]; $F_{r(2)} = 44.18$, $p < .001$; $n = 246$ [concurrent operant analysis]). Results of pairwise contrasts are summarized in Table 6. Participants were significantly more likely to report they would use or recommend each strategy for elementary and middle school students relative to high school students. Participants also were significantly more likely to report they would use or recommend the concurrent operant analysis for elementary-age students than middle school students.

Disability status. More than 60% of participants reported they would use or recommend

the strategy for students regardless of disability status. For all three hypothesis testing strategies, mean rankings of ratings significantly differed based on student disability status ($F_{r(2)} = 61.80$, $p < .001$; $n = 247$ [functional analysis]; $F_{r(2)} = 42.90$, $p < .001$; $n = 245$ [antecedent analysis]; $F_{r(2)} = 25.28$, $p < .001$; $n = 248$ [concurrent operant analysis]). As shown in Table 6, participants were significantly more likely to report they would use or recommend each strategy for students with EBD or IDD relative to students with no disability. Participants also were significantly more likely to report they would use or recommend the functional and antecedent analysis for students with EBD than for students with IDD.

Setting type. Higher percentages of participants reported they would use or recommend each hypothesis testing strategy in special education classrooms than in general education classrooms, and in general education classrooms over empty classrooms or clinic rooms. Mean rankings of ratings also differed significantly among setting types for all three hypothesis testing strategies ($F_{r(2)} = 33.40$, $p < .001$; $n = 249$ [functional analysis]; $F_{r(2)} = 49.26$, $p < .001$; $n = 246$ [antecedent analysis]; $F_{r(2)} = 37.88$, $p < .001$; $n = 245$ [concurrent operant analysis]. Pairwise contrasts showed participants were significantly more likely to report they would use or recommend each strategy if it were conducted in a special education classroom than in a general education classroom or a clinic room. In addition, participants were significantly more likely to report they would use or recommend the antecedent analysis if it were conducted in a general education classroom than in a clinic room.

Behavior risk status. More than 65% of participants reported they would use or recommend each hypothesis testing strategy regardless of the level of risk associated with the challenging behavior. When targeting low-risk problem behaviors, a higher percentage of participants reported they would use or recommend the concurrent operant analysis (77.3%) than

the functional analysis (68.8%) or antecedent analysis (70.6%). Within each hypothesis testing strategy, however, mean rankings of ratings did not differ by risk level (see Table 6).

Barriers

Percentages of participants who agreed or strongly agreed with each potential barrier ranged from 11.3%–52.6% (listed by hypothesis testing strategy in Table 4). Across strategies, the largest percentage of participants (29.5%–52.6%) agreed or strongly agreed that the student's problem behavior might temporarily worsen during the assessment; the smallest percentage of participants (11.3%–12.4%) reported concern that results of the assessment would not lead to an effective behavior support plan. Mean rankings of ratings varied significantly among hypothesis testing strategies for eight of the 10 listed barriers (see barriers noted with asterisks in Table 4). Results of pairwise contrasts are summarized in Table 7. Participants rated the concurrent operant analysis more favorably than the functional analysis across seven of the eight barriers rated differently by strategy. Participants also rated the antecedent analysis more favorably than the functional analysis for the same seven barriers, though effect sizes were smaller than those representing significant differences between the concurrent operant analysis and functional analysis. Participants rated the concurrent operant analysis more favorably than the antecedent analysis for five of the eight barriers (i.e., scheduling the assessment during the school day, temporary worsening of challenging behavior, lack of support from FBA team members to complete the assessment, difficulty of procedures, and limited access to appropriate space).

Discussion

Results of the current study offer insights on school practitioner views of three hypothesis testing strategies that represent practical variations or alternatives to the standard functional analysis. Results extend previous practitioner survey studies on FBA methods, which have

compared broader categories of assessment (e.g., indirect vs. direct assessment; descriptive assessment vs. experimental analysis) and focused on the standard functional analysis. In addition, while previous surveys relied on brief written descriptions or case summaries to define assessment types, we embedded video overviews describing the critical elements of each hypothesis testing strategy in the current survey before asking participants to rate each strategy across several dimensions. Relative to written descriptions, we anticipated brief video overviews would be more likely to maintain respondents' attention while offering illustrative examples of critical components of the assessment process (e.g., data collection, graphing).

Survey results informed practitioner views on three dimensions: acceptability of procedures, feasibility of implementation, and utility of assessment results. With respect to utility, the majority of practitioners rated all three hypothesis testing strategies favorably, with no significant differences among strategies. These ratings of utility suggest practitioners viewed each strategy as contributing valuable information to design behavior support plans, even though each analysis tests a different type of hypothesis. Most practitioners also agreed the procedures defining each strategy were acceptable. Ratings of acceptability were higher, however, for the concurrent operant analysis relative to the functional analysis. This difference likely reflects a lower acceptability of evoking and reinforcing challenging behavior (functional analysis) relative to evaluating patterns of choice allocation (concurrent operant analysis). Practitioners' acceptability and utility ratings of the functional analysis were consistent with responses from O'Neill et al. (2015b), in which special educators positively rated the appropriateness and utility of the standard functional analysis based on a 2-3 sentence description of this approach. We consider the generally high levels of acceptability and utility in the current study promising, as ratings were made after viewing a video describing critical components of an abbreviated model

for functional analysis. Interestingly, our exploratory comparisons suggested that participants with previous experience using each strategy considered them more acceptable, feasible, and useful relative to participants without previous experience. These patterns should be interpreted with caution, as we do not know what types of experiences participants had with each assessment strategy. Empirical evaluations of whether and how practitioner perceptions of hypothesis testing strategies change after gaining direct experience with them are warranted, and may inform methods of training and professional development that would promote more positive perceptions of these assessment approaches.

Views on feasibility of implementation differed by strategy, with the concurrent operant analysis rated as more feasible relative to the functional and antecedent analyses, and the antecedent analysis rated as more feasible than the functional analysis. Responses to questions on perceived barriers further supported the differentiated feasibility ratings. That is, participants consistently agreed with identified barriers to a greater degree when rating the functional analysis relative to the antecedent and concurrent operant analyses. These ratings also offered insight on aspects of functional analysis implementation that were perceived as most challenging—namely, the potential for problem behavior to temporarily worsen, the time and scheduling required, and a lack of support from other members of an FBA team. A recent survey by Oliver et al. (2015) found practicing behavior analysts identified similar types of barriers to using the standard functional analysis, but to different degrees than the school practitioners included in the current study. For example, more than half of the respondents in Oliver et al. identified lack of an appropriate space as a barrier to implementation, relative to 26% of respondents in the current study. However, more respondents in the current study identified a lack of support of other trained staff (FBA team members) and other stakeholders (e.g., parents,

administrators) as barriers than in the study by Oliver et al. Considering Oliver et al. included behavior analysts that practiced in a variety of settings (e.g., school, home, clinic), these differences may highlight barriers unique to implementing functional analyses in schools. To date, perceived barriers to implementing antecedent or concurrent operant analyses in schools have not been evaluated. However, in the current study, practitioners consistently rated these strategies more favorably than the functional analysis on barriers that have been identified in previous literature.

With respect to conditions of use, practitioners reported being more likely to use or recommend each strategy for students in elementary- and/or middle-school grades than students in high school. Several open-ended responses in the sections on functional and antecedent analysis pointed to practical challenges unique to secondary students (e.g., complex schedules, involvement of more school personnel). Practitioners also reported being more likely to use or recommend each strategy when completed in special education classrooms than general education classrooms or separate clinic rooms. Open-ended responses in the sections on functional and antecedent analysis consistently indicated a belief that analyses conducted in separate clinic rooms would not be relevant to the student's usual classroom setting. In contrast, open-ended responses in the section on concurrent operant analysis indicated a concern that the assessment would be distracting to other students if conducted in general education classrooms. These concerns highlight a need to consider the potential impact of context on outcomes and usability of hypothesis testing strategies when conducting these assessments in schools.

Practitioners reported being more likely to use or recommend each hypothesis testing strategy for students with disabilities than students without disabilities. They also reported being more likely to use or recommend the functional and antecedent analysis for students with EBD

relative to students with IDD, though the effect sizes for these differences in ratings were small. This finding is interesting in light of questions raised by scholars in the field of school-based FBA of whether functional analysis (and variations thereof) are appropriate for students with EBD (e.g., Sasso et al., 2001). At the very least, it suggests practitioners consider these assessment approaches to be valuable beyond the IDD population. Within each hypothesis testing strategy, mean rankings of practitioner ratings did not differ between high- and low-risk challenging behavior. This outcome is consistent with results of O'Neill et al. (2015b), who found no difference in practitioner acceptability ratings of the standard functional analysis based on problem behavior severity. However, we also noted that when considering students with low-risk challenging behavior, a greater percentage of participants in our study reported they would use or recommend the concurrent operant analysis than the functional or antecedent analysis. Considering practitioners rated the concurrent operant analysis favorably with respect to feasibility, this pattern might reflect a preference to start with the most feasible assessment strategy for low-risk challenging behavior, and reserve more effortful analyses that directly test hypotheses of when and why a student engages in challenging behavior for more severe cases. This approach is consistent with recent recommendations for schools to offer a continuum of function-based support (Loman & Horner, 2014; Strickland-Cohen & Horner, 2015).

Limitations

Results of the current study should be interpreted in light of the following limitations. First, although survey respondents represented 68 school districts across the state, a third of respondents (33.6%) worked in a large metropolitan district near the university. This district is unique in several respects, including its size (i.e., more than 175 schools and 82,000 students), student diversity (approximately 71% non-White and 47% identified as economically

disadvantaged; 13% receiving special education services), and district-level behavior support (i.e., BCBAs who provide general education consultation in addition to those serving students with disabilities). In contrast, the majority of other survey respondents represented smaller rural districts throughout the state that did not have district-employed BCBAs. We explored the possibility of a nesting effect for school district via intraclass correlation (ICC) analyses, and found that district accounted for minimal variance in participant ratings. However, given the focus on practitioners from a single state, the omission of several districts in the recruitment process, and the unknown response rates from a subset of recruitment strategies, we cannot generalize findings to a nationally representative sample of school practitioners who participate in the FBA process.

Second, our video overviews presented simplified depictions of each hypothesis testing strategy. Our goal was to emphasize each strategy's critical components and help viewers understand their primary distinctions, in as brief a format as possible. Participant responses to questions about each strategy are limited to these simplified depictions. Third, despite the brief nature of these videos, we cannot confirm that all participants watched all three videos in their entirety. We did, however, counterbalance video sequence across survey versions to account for potential sequence effects, and excluded any participants who reported difficulty accessing any of the videos in open-ended responses. Fourth, although surveys were completed anonymously and on a voluntary basis, responses may have been affected by social desirability factors. We were surprised to find, for example, that roughly half of all respondents reported having prior experience with each hypothesis testing strategy after watching a video describing their procedures. It is possible practitioners who were more familiar with experimental analysis were more likely to complete the survey, or that participants interpreted "any previous experience"

more broadly than we intended (e.g., watching others conduct each hypothesis testing strategy). Higher ratings by practitioners who reported having previous experience could have been due to participants overestimating both their familiarity with, and favorable impressions of, each assessment strategy. Because our primary analyses focused on within-participant comparisons, however, any impact of social desirability was likely similar across strategies and would not explain differentiated patterns among or within hypothesis testing approaches. Fifth, responses to survey questions on conditions of use should be interpreted with caution. While many participants reported having experience across multiple grade levels and student populations, we did not control for these types of experiences when summarizing and analyzing their responses.

Implications for Research and Practice

Results of the current survey suggest school practitioners who support students with challenging behavior believe there is added value of hypothesis testing as a component of FBA, at least under certain conditions. With respect to feasibility and barriers to implementation, the perceived advantages of the antecedent and concurrent operant analysis over the functional analysis suggest practitioners may be willing to use these strategies as alternatives when functional analysis is not possible. Before recommendations can be offered to practitioners, however, more research is needed to evaluate the necessary conditions for FBA teams to use each hypothesis testing strategy independently and optimally. Extensive research has shown that hypothesis testing strategies can be implemented successfully in school settings to design effective function-based interventions, yet in the vast majority of these studies, practitioners received substantial support from research staff (Lloyd et al., 2016). Less is known about the necessary conditions for which school teams can implement hypothesis testing strategies independently. Identifying these conditions will require evaluations of training methods to

support appropriate use and implementation, models for distributing responsibilities among FBA team members, and guidelines for which strategies require supervision from a practitioner with expertise in behavioral assessment (e.g., BCBA supervision when conducting a functional analysis). In addition, further research is needed to identify strategies to help practitioners overcome other commonly-reported barriers to incorporating hypothesis testing in FBA (e.g., time commitments and scheduling, lack of support from other school staff and stakeholders).

The perspectives of school practitioners who are likely to play distinct roles in the FBA process should also be further explored. In the current study, our aim was to recruit a representative sample of school practitioners involved in the FBA process in [state masked], which meant we included a range of professional roles in our sample. Other recent surveys focusing on practitioners who serve students with the most intensive behavior support needs have included similarly varied samples (e.g., Bambara, Goh, Kern, & Caskie, 2012). It is possible, however, that practitioners in different professional roles (e.g., classroom teacher vs. itinerant specialist), or those with different training backgrounds or credentials (e.g., general educator vs. special educator; licensed teacher vs. BCBA), have distinct views on the social validity of hypothesis testing strategies, the conditions in which each strategy should be applied, and how roles and responsibilities should be allocated among members of an FBA team. In the current study, we explored potential differences between participants with and without the BCBA credential, and found similar patterns in ratings of acceptability, feasibility, and utility. However, higher percentages of practitioners with BCBAs agreed or strongly agreed with a subset of barriers to conducting functional analyses in schools (i.e., problem behavior might temporarily worsen; insufficient support from other members of the FBA team; insufficient support from other stakeholders). Future research aiming to directly compare views between

practitioner or other stakeholder groups are needed. Understanding different stakeholder experiences with and perspectives on hypothesis testing strategies may inform the roles and responsibilities likely to facilitate successful collaborations among team members.

Finally, while a variety of tools and resources have been developed to guide practitioners through the FBA process (e.g., IRIS Center, 2009; Loman, Strickland-Cohen, Borgmeier, & Horner, 2013; O'Neill et al., 2015a), no guiding framework currently exists for incorporating hypothesis testing into FBAs. Another promising avenue for future research is the development of decision tools designed to help teams (a) decide when to include hypothesis testing as a component of a student's FBA and (b) select the most appropriate strategy based on student and setting characteristics, available resources, and the primary question or hypothesis to be tested. Such decision tools would help expand a continuum of function-based support to reach the students with the most significant behavior support needs.

Conclusion

Schools implementing multi-tiered systems of behavior support are likely to encounter some number of students with sufficient behavioral complexity to require hypothesis testing as a component of FBA. Hypothesis testing strategies can offer an added level of rigor when descriptive FBAs produce inconclusive or conflicting results across sources. While practical variations of the standard functional analysis have been evaluated in the research community, less is known about how these strategies are viewed in communities of practice. These survey results show promise for the social validity of three types of hypothesis testing strategies, and highlight what work still needs to be done to put these tools in the hands of qualified school practitioners.

Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent: Due to the anonymous nature of survey data collected, informed consent was not required for this study, which was approved as an "exempt study" by [university masked] Institutional Review Board.

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Table 1

Participant Demographics

Demographic Variable	N	%
Gender		
Male	45	17.8
Female	208	82.2
Race		
White	221	87.4
Black	23	9.1
Multiracial	6	2.4
Hispanic/Latino	2	0.8
Asian	1	0.4
Education		
Master's	174	68.8
Bachelor's	51	20.2
Specialist	18	7.1
Doctoral	8	3.2
Position		
Special Educator	173	68.4
Behavior Specialist	43	17.0
General Educator	7	2.8
School Counselor	6	2.4
Administrator	5	2.0
Other Itinerant Position	19	7.5
Grade Levels		
Early Elementary (Grades K-2)	99	39.1
Late Elementary (Grades 3-5)	111	43.9
Middle/Junior High (Grades 6-8)	126	49.8
High School (Grades 9-12)	112	44.3
Primary Classroom Setting		
Self-Contained Special Education Classroom	144	56.9
General Education Classroom	83	32.8
Combination of Other Settings	26	10.3
Student Population		
Autism Spectrum Disorder	211	83.4
Other Health Impairment	189	74.7
Specific Learning Disability	186	73.5
Intellectual Disability	173	68.4
Speech/Language Impairment	169	66.8
Emotional Disturbance	164	64.8
Multiple Disabilities	119	47.0
Traumatic Brain Injury	63	24.9
Hearing Impairment	47	18.6
Orthopedic Impairment	47	18.6
Visual Impairment	45	17.8
Deaf-Blindness	18	7.1
Typically Developing	63	24.9
Intellectually Gifted	60	23.7

Table 2

Summary of Reported Experience with Functional Behavior Assessment Components

	% Selecting			
FBA Component	None	1-2 Students	3-5 Students	>5 Students
Participated on FBA team	1.2	27.7	24.5	46.6
Reviewed FBA data	2.0	23.3	25.3	49.4
Completed behavior rating scales or questionnaires about a student's behavior	6.7	20.6	27.7	45.1
Completed open-ended interviews about a student's behavior with school staff, parents, or students	6.7	20.2	26.1	47.0
Completed record reviews	9.9	19.0	20.2	51.0
Completed a functional/experimental analysis	39.1	27.3	13.8	19.8
Collected direct observation data on student behavior	3.2	23.7	22.5	50.6
Developed behavior support plans	5.1	22.9	27.3	44.7
Implemented behavior support plans	3.6	22.5	24.5	49.4
Monitored behavioral progress	2.4	19.1	23.5	55.0
Supervised completion of an FBA	27.3	24.5	17.8	30.4
Trained school staff on how to complete an FBA	61.3	15.8	4.0	19.0

Note. Participants were asked to indicate the number of students for whom they completed each component within the last three years.

Table 3

Summary of Video Content for each Hypothesis Testing Strategy

Content	Functional Analysis	Antecedent Analysis	Concurrent Operant Analysis
Hypothesis type	When and why a student engages in challenging behavior	What triggers a student's challenging behavior	What a student prefers to work for
Example hypothesis	When the teacher attends to other students, Ivy engages in disruptive behaviors to get 1:1 teacher attention.	When directed to complete difficult tasks, Mia engages in property destruction.	Tre will work to earn 1:1 time with a preferred adult *or* Tre will work to earn time on the iPad.
Procedures	Test condition: Present antecedent (diverted attention); if disruptive behavior occurs, deliver consequence (1:1 attention) Control condition: Deliver 1:1 attention throughout	Test condition: Present difficult task Control condition: Present easy or preferred task	Table 1: Work on math to earn time with preferred adult Table 2: Work on math to earn time on iPad
Data collection	Tally challenging behaviors	Tally challenging behaviors	Record time spent at Table 1 vs. 2
Graphed data pattern supporting hypothesis	Higher tallies of challenging behavior in test condition than control condition (repeated across sessions)	Higher tallies of challenging behavior in test condition than control condition (repeated across sessions)	More time spent at Table 1 than Table 2 (repeated across sessions)
Link to access video	https://vimeo.com/199572352	https://vimeo.com/199572367	https://vimeo.com/199572378

Table 4

Percentages of Participants Who Agreed or Strongly Agreed with Each Listed Barrier by Hypothesis Testing Strategy with Results of Non-parametric Tests

Barriers	% Agreed or Strongly Agreed			Friedman tests	
	Functional Analysis	Antecedent Analysis	Concurrent Operant Analysis	*F*	*p*
*This assessment would take too much time to complete.	39.0	26.4	20.7	37.89	<.001
*This assessment would be too difficult to schedule during the school day.	41.8	33.1	23.1	41.84	<.001
*The student's problem behavior might temporarily worsen during the assessment.	52.6	46.7	29.5	48.59	<.001
I don't have the necessary training/expertise to use this assessment.	23.4	24.8	23.9	1.48	.476
*I don't have enough support from other members of an FBA team to complete this assessment.	36.9	29.7	23.1	29.74	<.001
*The assessment procedures are too difficult to implement correctly and consistently.	24.5	15.9	13.1	18.59	<.001
*I don't have access to an appropriate space to complete this assessment.	25.7	19.1	15.9	21.47	<.001
*I don't have support from other relevant stakeholders (e.g., administrators, parents) to use this assessment.	29.7	24.4	18.7	22.60	<.001
*I don't feel confident about interpreting results of this assessment.	16.9	14.2	13.1	6.02	.049
I don't feel confident that results of this assessment would lead to an effective behavior support plan.	11.3	11.4	12.4	0.45	.799

Note. Asterisks denote barriers on which mean rankings of ratings were significantly different (critical alpha = .05) by hypothesis testing strategy.

Table 5

Percentages of Participants Who Agreed or Strongly Agreed They Would Use or Recommend Each Hypothesis Testing Strategy by Student and Setting Factors

Student and Setting Factors	% Agreed or Strongly Agreed		
	Functional Analysis	Antecedent Analysis	Concurrent Operant Analysis
Grade level			
Elementary	74.6	73.4	78.1
Middle	70.9	73.2	73.5
High	59.2	61.1	59.5
Disability			
Emotional/behavioral disorder	81.1	79.8	83.5
Intellectual/developmental disability	76.3	76.9	81.6
No disability	61.9	66.5	72.6
Setting type			
Special education classroom	75.3	79.1	82.3
General education classroom	64.4	69.4	70.3
Clinic room	55.8	54.5	62.9
Behavior risk status			
High-risk behavior	74.3	70.9	75.9
Low-risk behavior	68.8	70.6	77.3

Table 6

Results of Pairwise Contrasts for Ratings of Conditions of Use

	Wilcoxon signed rank tests								
	Functional Analysis			Antecedent Analysis			Concurrent Operant Analysis		
Contrasts	*z*	*p*	ES	*z*	*p*	ES	*z*	*p*	ES
Grade level									
Elementary vs. High	-4.82	<.001	0.31	-4.16	<.001	0.27	-5.03	<.001	0.32
Middle vs. High	-4.42	<.001	0.28	-4.04	<.001	0.26	-4.08	<.001	0.26
Elementary vs. Middle	-1.96	.051	n/a	-1.22	.222	n/a	-2.85	.004	0.18
Disability									
EBD vs. No disability	-6.83	<.001	0.43	-5.89	<.001	0.38	-4.24	<.001	0.27
IDD vs. No disability	-4.61	<.001	0.29	-3.45	.001	0.22	-3.28	.001	0.21
EBD vs. IDD	-2.64	.008	0.17	-2.47	.013	0.16	-0.50	.620	n/a
Setting type									
Special vs. General	-5.74	<.001	0.36	-4.73	<.001	0.30	-4.74	<.001	0.30
Special vs. Clinic	-3.75	<.001	0.24	-5.92	<.001	0.38	-5.53	<.001	0.35
General vs. Clinic	-0.54	.586	n/a	-3.21	.001	0.20	-1.16	.245	n/a
Behavior risk status									
High vs. Low	-1.53	.127	n/a	-0.13	.900	n/a	-0.63	.532	n/a

Note. EBD = emotional/behavioral disorder; IDD = intellectual/developmental disability; adjusted critical alpha = .017 for grade level, disability, and setting contrasts.

Table 7

Results of Pairwise Contrasts for Barriers that Differed Significantly by Hypothesis Testing Strategy

	Wilcoxon signed rank tests								
	FA vs. AA			AA vs. COA			FA vs. COA		
Contrasts	*z*	*p*	ES	*z*	*p*	ES	*z*	*p*	ES
This assessment would take too much time to complete.	-5.08	<.001	0.32	-1.36	.173	n/a	-5.45	<.001	0.35
This assessment would be too difficult to schedule during the school day.	-3.59	<.001	0.23	-3.73	<.001	0.24	-6.20	<.001	0.39
The student's problem behavior might temporarily worsen during the assessment.	-2.64	.008	0.17	-4.95	<.001	0.32	-6.57	<.001	0.42
I don't have enough support from other members of an FBA team to complete this assessment.	-2.92	.003	0.19	-3.53	<.001	0.23	-5.17	<.001	0.33
The assessment procedures are too difficult to implement correctly and consistently.	-2.70	.008	0.17	-2.56	.011	0.16	-4.19	<.001	0.27
I don't have access to an appropriate space to complete this assessment.	-3.00	.003	0.19	-2.73	.006	0.17	-4.49	<.001	0.29
I don't have support from other relevant stakeholders (e.g., administrators, parents) to use this assessment.	-3.68	<.001	0.24	-2.18	.029	n/a	-4.61	<.001	0.29
I don't feel confident about interpreting results of this assessment.	-0.84	.404	n/a	-1.79	.074	n/a	-2.24	.025	n/a

Note. FA = functional analysis; AA = antecedent analysis; COA = concurrent operant analysis; adjusted critical alpha = .017.

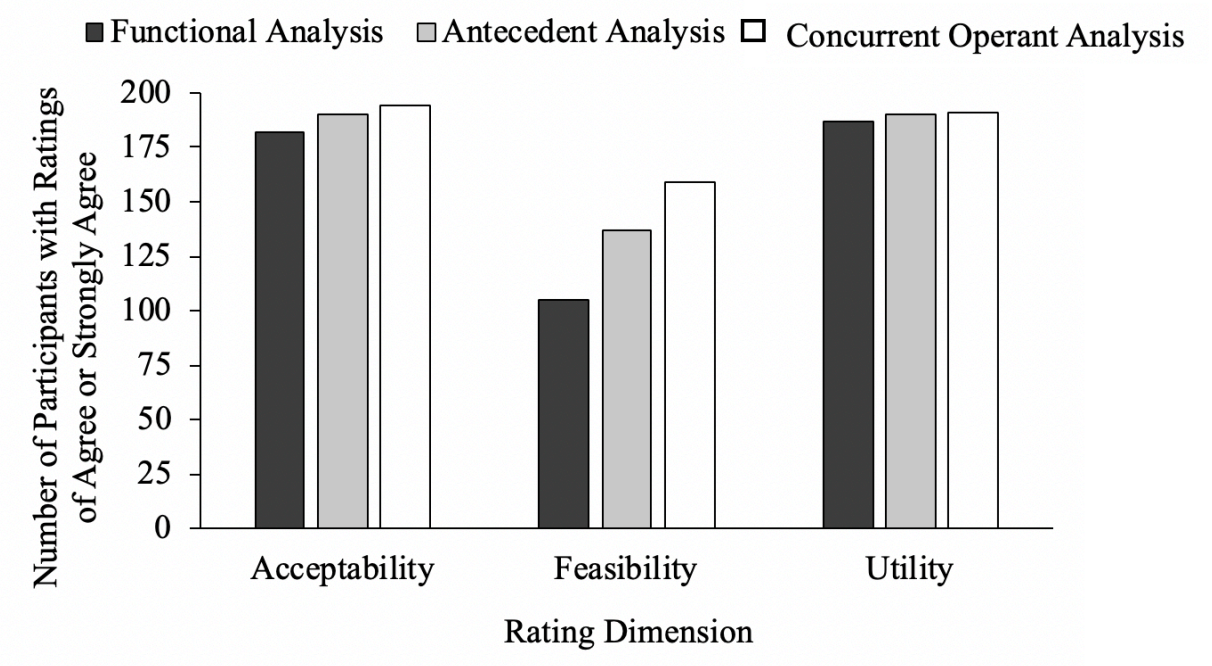

Figure 1. Number of participants who agreed or strongly agreed that each hypothesis testing strategy was acceptable, feasible, and useful.

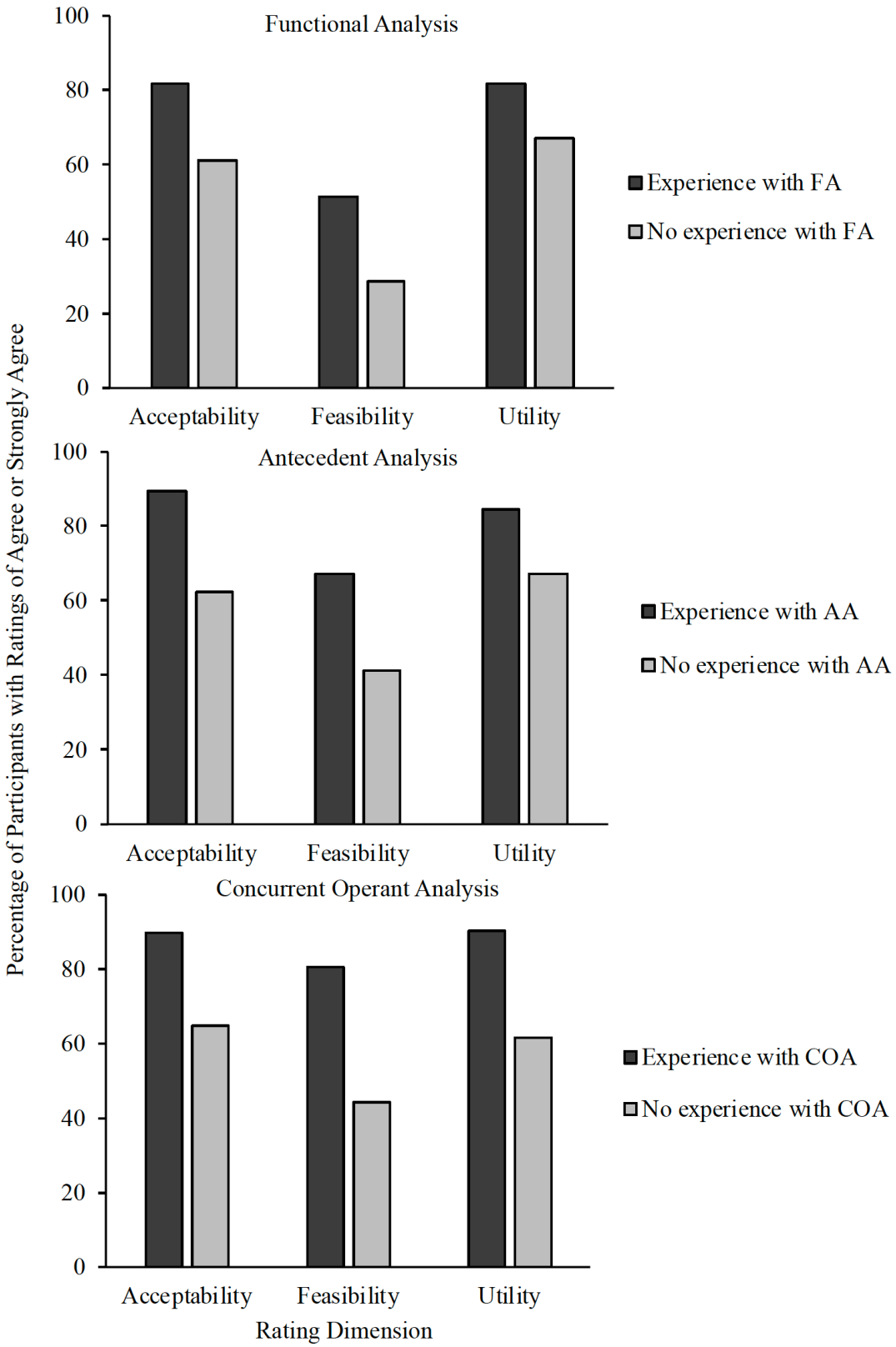

Figure 2. Percentage of participants with and without experience conducting each analysis who agreed or strongly agreed that the functional analysis (top panel), antecedent analysis (middle panel), and concurrent operant analysis (bottom panel) was acceptable, feasible, and useful.